

Claims

1. A fuel injection valve for internal combustion engines, having a valve body (1) in which a bore (3) is embodied that is defined on its end toward the combustion chamber by a conical valve seat (12), and having a pistonlike valve needle (5) which is disposed longitudinally displaceably in the bore (3) and which on its end toward the combustion chamber has a valve sealing face (10) that includes two conical faces (20; 22), the second conical face (22) being disposed on the combustion chamber side of the first conical face (20), and an annular groove (25) extends between the conical faces (20; 22), and its end facing away from the combustion chamber, upon contact of the valve sealing face (10) with the valve seat (12), acts as sealing edge (27), characterized in that recesses (35) are embodied on the valve sealing face (10) that hydraulically connect the annular groove (25) with a portion of the second conical face (22) located on the combustion chamber side of the annular groove (25).
2. The fuel injection valve according to claim 1, characterized in that the recesses (35) are embodied as a roughening of the valve sealing face (10).
3. The fuel injection valve according to claim 1, characterized in that the recesses (35) are embodied as polished plane sections (37).
4. The fuel injection valve according to claim 1, characterized in that the recesses (35) are embodied as a plurality of grooves (38).
5. The fuel injection valve according to claim 1, characterized in that the valve sealing face (10) is adjoined toward the combustion chamber by a dead-end volume (40), from

which at least one injection opening (11) extends away, and the recesses (35) extend at least as far as the transitional edge (42) between the dead-end volume (40) and the valve seat (12).

6. The fuel injection valve according to claim 4, characterized in that all the grooves (38) begin in the same radial plane as the valve needle (5) and extend from there in the direction of the combustion chamber.

7. The fuel injection valve according to claim 6, characterized in that the grooves (38) have different lengths.

8. The fuel injection valve according to claim 4, characterized in that the grooves (38) extend beyond the injection openings (11).

9. The fuel injection valve according to claim 4, 6, 7 or 8, characterized in that the end of the grooves (38) facing away from the combustion chamber is located inside the annular groove (25).

10. The fuel injection valve according to claim 4, characterized in that the grooves (38) are microscopic grooves, whose depth (t) is less than 50 μm .

11. The fuel injection valve according to claim 4, characterized in that the grooves (38) have a width (b) of 5 μm to 50 μm .

12. The fuel injection valve according to claim 4, characterized in that the grooves (38) are embodied rectilinearly and extend along the jacket lines of the second conical face (22).

13. The fuel injection valve according to claim 4, characterized in that the grooves (38) are rectilinear and are inclined relative to the jacket lines of the second conical face (22).

14. The fuel injection valve according to claim 4, characterized in that the depth (t) of the grooves (38) is from 1 to 10 times their width (b).

15. The fuel injection valve according to claim 4, characterized in that the width (b) of the grooves (38) decreases from their end facing away from the combustion chamber toward the combustion chamber.

16. The fuel injection valve according to claim 4, characterized in that the grooves (38) are curved in an S shape.

17. The fuel injection valve according to claim 4, characterized in that the grooves (38) extend as far as the end toward the combustion chamber of the valve needle (5).

18. A fuel injection valve for internal combustion engines, having a valve body (1) in which a bore (3) is embodied that is defined on its end toward the combustion chamber by a conical valve seat (12), and having a pistonlike valve needle (5) which is disposed longitudinally displaceably in the bore (3) and which on its end toward the combustion chamber has a valve sealing face (10) that includes two conical faces (20; 22), the second conical face (22) being disposed on the combustion chamber side of the first conical face (20), and an annular groove (25) extends between the conical faces (20; 22), and its end facing away from the combustion chamber, upon contact of the valve sealing face (10) with the valve seat (12), acts as sealing edge (27), characterized in that

recesses (35) are embodied on the valve seat (12) that hydraulically connect the annular groove (25) with a portion of the valve seat (12) located on the combustion chamber side of the annular groove (25).

19. The fuel injection valve according to claim 18, characterized in that the recesses (35) are embodied as rectilinear grooves.

20. The fuel injection valve according to claim 19, characterized in that injection openings (11) extend away from the valve seat (12), and the grooves (38) extend as far as the level of these injection openings (11).

21. The fuel injection valve according to claim 20, characterized in that the grooves (38) extend between the injection openings (11).

22. The fuel injection valve according to claim 20, characterized in that the grooves (38) extend beyond the injection openings (11).

23. The fuel injection valve according to claim 18, characterized in that the valve seat (12) is adjoined toward the combustion chamber by a dead-end volume (49), from which a plurality of injection openings (11) extend, and in the valve seat (12) grooves (38) are embodied which extend from the annular groove (25) to the transitional edge (42) of the valve seat (12) with the dead-end volume (40).

24. The fuel injection valve according to one of the foregoing claims, characterized in that the recesses (35; 38) are produced by a laser process.